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FINAL REPORT

CONTRACT Nonr-668(01)

VISUAL AIDS TO GROUND ATTACK

Institute of Optics

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Work on visual aids to ground observation and attack by aircraft terminated on July 31, 1953 at the expiration date of Contract Nonr-668(01). A certain amount of preliminary information, measurements, and general consideration of the overall problem of identification of ground objects from fast moving aircraft were accumulated during the period of this work. These are discussed in several reports submitted, especially in the Status Report of January 2, 1953. In this report we proposed that a 3 to 3.5 X telescopic system be designed and constructed for installation in the nose of a high performance type plane in order to evaluate the merits of such system under actual flight conditions. The Lockheed TV-2 aircraft was tentatively selected for installation, but the Navy did not assign such a plane for this purpose. On May 12 we submitted an optical and mechanical design for the proposed system. Eventual response from the Navy was to the effect that the proposed system was too large, space consuming, and that image quality would be impaired by vibration of the plane. Also, it appeared that it would be difficult to assign a plane because of other demands. In order to keep the plane installation and use time at a minimum, and to make a quick experiment showing perceptual effects as well as possible vibration troubles, our last proposal was to install an existing U of R 3 power telescope with a 1 inch diameter exit pupil in the cockpit of the plane between the pilot and windshield. This was presented in our letter report of June 30, 1953. This simple installation was also not approved by the Navy.

Our observations of the way in which this problem was presented to us and administered by the Navy are as follows:

(1) Lack of conviction that there was a real problem to be solved.

Evidence from flight reports and experiences of pilots would seem to indicate that in Korea there had been difficulty in target identification and general ground observation which would warrant an investigation of optical aids and a developmental research program as originally proposed. However, the importance of the problem in view, no doubt, of many others, was never manifest in the administering of the contract by the Navy. Best evidence of this is the fact that at no time could a plane be assigned for installation of any optical system.

(2) Lack of initiative to experiment and draw conclusions on merits alone of the system proposed.

This situation is perhaps further evidence of #1 above. It appears to us that preclusions such as the proposed optical-mechanical system was too large, space consuming, and that the image quality would be unavoidably deteriorated by vibration are prejudiced opinions. They are irrelevant to the performance and usefulness of any proposed instrument as determined by direct experiment. If competent observers and pilots should evaluate such a telescopic system as highly efficient and desirable, then and only then might a proper compromise between space consumed by such a system and other equipment in the plane be ascertained. Although possible adverse characteristics were quickly pointed out, the possibilities of adapting the system for radar screen relaying, for fire control, or for visual presentation of other information were not fully recognized.

No doubt, with increasing aircraft speeds, this subject of ground object recognition and identification will come up for further consideration in the future. When it does we hope that the investigation is carried through to a satisfactory conclusion.